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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/657,110
Filing Date: September 09, 2003
Appellant(s): HOEG ET AL.

Wesley W. Whitmyer, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 7/5/2006 appealing from the Office action mailed 4/3/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,241,657	Chen et al	6/2001
2002/0022767	Dohi et al	2/2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims: claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al in view of Dohi et al.

With regard to claim 9:

Chen discloses a method for improving a diagnostic or surgical procedure involving a variable direction of view endoscope with a variable line of sight comprising:

acquiring volumetric scan data of a subsurface structure ("[d]atabase means 70 comprise a data storage device or medium 150 containing one or more 3-D computer models ... of the anatomical objects 30 which are to be visualized by anatomical visualization system 10 ... Such software objects are of the sort well known in the art and may have been created, for example, through post-processing of CT or MRI scans of

the patient using techniques well known in the art," *col.5/line63-col.6/line17*);

positioning said endoscope relative to said subsurface structure, acquiring configuration data of an internal view changing mechanism of the said endoscope, and establishing the position of said endoscope relative to said subsurface structure ("[e]ndoscope tracking means 50 comprise a tracking system of the sort well known in the art. More particularly, endoscope tracking means 50 may comprise a tracking system 97 of the sort adapted to monitor the position [relative to said subsurface structure] and orientation [internal endoscope configuration data] of an object in space and to generate output signals which are representative of the position and orientation of that object ...Tracking system 97 is attached to endoscope 90 such that the output signals generated by tracking system 97 will be representative of the spatial positioning and orientation of endoscope 90," *col.5/lines3-19*);

and based on said volumetric scan data ("3-D computer models," as noted above; represented by "anatomical software objects 30A', 30B' AND 30C'," *8/25-26*), said endoscope position data* ("spatial positioning... of endoscope 90," as noted above; "first software object 90A' representative of the shaft of the endoscope 90," *7/36-40*), and said configuration data ("orientation of endoscope 90," as noted above;

"second software object 90B'... representative of the video image acquired by endoscope 90... planar disk defined by the intersection of the of the endoscope's field of view with a plane set perpendicular to the center axis of that field of view," *7/41-48*; furthermore, "optical parameters for an endoscope can define the relationship between the endoscope 90A' and the disk 90B'," *7/51-52*), displaying representations of said subsurface structure and said endoscopic line of sight ("use the application program's image rendering software to merge these elements [anatomical 3-D computer models 130 and endoscope 3-D computer models 190] into a single composite image," *8/41-43*) in their correct relative spatial relationship ("various software objects are placed into proper registration with one another using techniques well known in the art," *8/31-33*).

Chen does not disclose that the acquired configuration data of said view changing mechanism (which are defined as "orientation of endoscope 90," as noted above, and/or "optical parameters," as noted above) of said endoscope is configuration data of an *internal* view changing mechanism of the said endoscope.

Dohi discloses an endoscope ("rigid endoscope 1," [0021]) with a view changing mechanism, and furthermore discloses an internal view changing

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although "endoscope position data" lacks explicit antecedence, it is interpreted that the step of

mechanism (comprising "first and second motors 7 and 8" and having complementary data encoders "[r]otary encoders 9 and 10," [0023]). Encoders "9" and "10" measure the change in actuators "7" and "8" and thereby provide a measure of the orientation of the endoscope.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art that Chen's endoscope, as broadly indicated (4/56-57), accommodate the particulars of an endoscope disclosed by Dohi. A skilled artisan would be motivated to do so because Dohi's endoscope allows for "[provision of] various endoscope images in good quality without the movement or bending of an endoscope" ([0008]). The resulting combination is not a broadly defined 'endoscope,' as disclosed by Chen ("endoscope 90"), but a more particular endoscope as disclosed by Dohi. In reduction to practice, a skilled artisan is motivated to use advantageous endoscope, and the advantages of an endoscope having an internal view changing mechanism are taught by Dohi. The resulting combination is obvious to one of ordinary skill.

With regard to claim 10: As noted above, Chen discloses displaying a representation of the rotational orientation of the endoscopic view, as represented by the "second software object 90B'... representative of the video image acquired by endoscope 90... planar disk defined by the intersection of the of the endoscope's field

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"establishing the position of said endoscope relative to said subsurface structure" requires the generation

of view with a plane set perpendicular to the center axis of that field of view." A three-dimensional representation of an endoscope along with its field of view inherently shows the rotational orientation of the endoscopic view.

With regard to claim 11: Chen shows that establishing endoscope position relative to said subsurface structure may comprise:

correlating at least one endoscopic view with the corresponding region of said volumetric scan data by feature matching and identification ("anatomical software objects 30A', 30B' and 30C'," *8/25-26*, as noted above); and

computing the relative position of said endoscope and said subsurface structure using said configuration data for each said endoscopic view and the location of each said corresponding region obtained through said feature matching, and identification ("the anatomical visualization system 10 is arranged so that the video signals output by endoscope 90 are, after being properly transformed by video processing means 95 into the digital data format required by digital computer 130, texture mapped onto the planar surface of disk 90B'," *7/52-57*).

With regard to claim 12: Chen further discloses selecting a target point relative to said volumetric scan data; and instructing said endoscope to direct its line of sight towards said target point ("The application program software 140 of computer means 60 is configured so as to enable physician 20 to quickly and easily specify a particular

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of "endoscope position data."

viewing position (i.e., a "virtual camera" position in computer graphics terminology) for which the application program's image rendering software should render a visualization of the 3-D software models contained in database means 70," *9/60-66*).

With regard to claim 13: Chen further discloses selecting a path relative to said volumetric scan data; and instructing said endoscope to direct its line of sight to follow said path ("The application program software 140 of computer means 60 is configured so as to enable physician 20 to quickly and easily specify a particular viewing position (i.e., a "virtual camera" position in computer graphics terminology) for which the application program's image rendering software should render a visualization of the 3-D software models contained in database means 70," as noted above).

(10) Response to Argument

Applicant makes four separate arguments against the combination of Chen with Dohi. Applicant firstly contends that there is no suggestion to make the necessary modification to arrive at the claimed invention.

> More particularly, Applicant recites that the "mere fact that references *can be* combined or modified does not render the resultant combination obvious," and further, that "there is no suggestion in the prior art to make the combination necessary to arrive at [the] invention recited in claim 9." As noted above, the necessary modification is that the generically defined "endoscope 90" disclosed by Chen take a particular form, that form being one in which the endoscope has

an "internal view changing mechanism." As noted above, Dohi discloses that such an internal view changing mechanism "provides for various endoscope images in good quality without the movement or bending of the endoscope." Applicant contends that "Dohi's stated objective... does not provide any suggestion to combine such a mechanism with a tracking system such as Chen's." It is maintained that the advantages taught by Dohi are applicable and relevant without regard to the use or non-use of a tracking system. In reduction to practice, the generically defined endoscope disclosed by Chen must take some particular form; the particular form disclosed by Dohi has advantages which are clear to one of ordinary skill. Chen's generically defined "endoscope 90" allows for changing of position and orientation. Dohi's endoscope simply provides that orientation may advantageously be changed while not disturbing the position, a clear suggestion to modify Chen's invention.

Applicant secondly contends that the references do not enable one skilled in the art to make the necessary modification to arrive at the claimed invention.

More particularly, Applicant contends that "[i]t is unclear why the tracking system 97 is allegedly able to receive and process signals from rotary encoders in the scope." However, it is clear to a skilled artisan that the "rotary encoders 9 and 10" disclosed by Dohi are intended for tracking the orientation of the endoscope. Dohi explicitly discloses a "prism position-detecting part 14" ([0024]) which is analogous to the orientation-tracking component of the "tracking system

97." Chen simply discloses that "tracking systems are all well known in the art" and that "[t]racking system 97 is attached to endoscope 90 such that the output signals generated by tracking system 97 will be representative of the spatial positioning and orientation of the endoscope 90" (*5/13-17*). Surely a skilled artisan would observe that the same signals which allow the "prism position-detecting part 14" to detect the orientation of the Dohi's endoscope be applied to Chen's "tracking system 97" in order to determine the orientation of the endoscope.

Applicant thirdly contends that the references teach away from the necessary modification to arrive at the claimed invention.

Applicant notes that Dohi discloses the acquisition of images "of particular, focused areas *without moving or bending the scope*." In other words, Dohi enables a change in the orientation of the endoscope without requiring a change in the position of the endoscope. It is not clear how this "specifically teach[es] away" from anything disclosed by Chen, who discloses only that both position and orientation must be monitored.

Applicant notes that Chen "describes the advantage of being able to consider the scope and field of view software objects 90A, 90B as a single unit when being positioned within the 3-D computer models by maintaining a fixed relationship between the two." Applicant further contends that this equates to the suggestion that "it is undesirable to employ an internal view changing mechanism

that would change the direction of view relative to the position of the scope itself." On the contrary, Chen suggests only that, given a constant orientation (i.e., a constant spatial relationship between 90A' and 90B'), it is useful to consider the endoscope and field of view as a single unit. As noted by the Applicant, Chen predicates such a unitary recognition on the condition that "the optical characteristics of endoscope 90 remain constant"; in such a circumstance, Chen concludes that unitary recognition "can sometimes be convenient." The idea that a change in orientation can be disregarded in the event that a change in orientation is not occurring is not a specific teaching against combination with anything. Recall that Chen specifically addresses the tracking of endoscope orientation as a necessary step for proper registration of the endoscope with regard to its field of view.

Applicant fourthly contends that a combination of the references does not disclose all of the elements of the claimed invention.

As noted above, the "tracking system 97" disclosed by Chen is "attached to endoscope 90 such that the output signals generated by tracking system 97 will be representative of the spatial positioning and orientation of endoscope 90." Therefore, tracking system 97 may be considered as dually functioning: first, for tracking position, and second, for tracking orientation. The "prism position-detecting part 14" is clearly analogous to the element of "tracking system 97" which tracks orientation. Applicant contends that "even if an internal view

changing mechanism were incorporated into the Chen device, there is still no disclosure of 'acquiring configuration data' of such a view changing mechanism. As noted even by Applicant, Chen discloses just such an arrangement, except that Chen is silent with regard to the internal/external nature of the view changing mechanism: "adapted to monitor the position and orientation of an object in space and to generate output signals... representative of the spatial position and orientation of [the] endoscope." So certainly Chen discloses the monitoring of the orientation of the endoscope, and thus the change in view. Dohi discloses an analogous view changing mechanism (which is internal) and an analogous tracking system used specifically and deliberately for monitoring the orientation of the endoscope.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(12) Conclusion

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Philip Smith

Conferees:

Linda Dvorak, Tom Hughes